

Implementing Water Quality Improvements to Support Vital Fisheries in the Presumpscot River Watershed

*“It’s not often we’re given a second chance with something as fragile as a river.
Let’s keep working on it. After all, the Presumpscot River has worked hard in the
service of mankind for hundreds of years. It’s time we returned that favor”.*

- George Mitchell, former
U.S. Senator

Impaired Stream Segments-From 2002 Maine Integrated Water Quality and Assessment Report:

<u>Seg ID</u>	<u>Segment Name</u>	<u>Seg Size</u>	<u>Impaired Use</u>	<u>Potential Source</u>	<u>Status</u>
609R	Presumpscot River (below Sacarrapa Dam)	6.9 miles	Aquatic Life	Hydropower/NPS	TMDL Approved 1998
608R01	Presumpscot River (Dundee - Sacarrapa Dam)	16.1 miles	Aquatic Life	Gen Development NPS	TMDL Sched. 2004
607R01	Black Brook (Windham)	5.6 miles	Aquatic Life	Gen Development NPS	TMDL Sched. 2008
607R03	Colley Wright Brook (Windham)	7.6 miles	Aquatic Life/Recreation	Gen Development NPS	TMDL Sched. 2008
607R04	Piscataqua River (Falmouth, Cumberland)	12.5 miles	Recreation	NPS	
607R06	Hobbs Brook (Cumberland)	1.5 miles	Aquatic Life/Recreation	Gen Development NPS	TMDL Sched. 2008
607R07	Inkhorn Brook (Westbrook)	4.1 miles	Aquatic Life/Recreation	Gen Development NPS	TMDL Sched. 2008
607R08	Mosher Brook (Gorham)	1.8 miles	Aquatic Life/Recreation	Gen Development NPS	TMDL Sched. 2008
607R09	Otter Brook (Windham)	1.9 miles	Aquatic Life/Recreation	Gen Development NPS	TMDL Sched. 2008
607R10	Thayer Brook (Gray)	4.3 miles	Aquatic Life	Agricultural NPS	TMDL Sched. 2008
607R11	Nason Brook (Gorham)	2.7 miles	Recreation	NPS	

Presumpscot River Watershed Hydrologic Unit Code (HUC): 01060001

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Abstract

The Presumpscot River, once considered so polluted that it rated among the most endangered rivers in the country, is an ecologically and historically significant river in southern Maine. The Casco Bay Estuary Project, in close collaboration with the Presumpscot River Watershed Coalition, proposes to implement a suite of projects to improve water quality, enhance riparian habitat, support vital fisheries, and foster increased stewardship and awareness among watershed inhabitants.

The proposed projects will build upon recent progress made to restore the River by implementing significant watershed improvements. Demonstration projects will model land stewardship practices to watershed landowners and land users. Project partners will monitor bacteria, nutrient, and toxic contaminant loads to the watershed and provide an indication of measurable progress. The project's educational outreach elements will serve to actively engage multiple watershed stakeholder groups and the entire project will serve as a replicable model for neighboring watersheds facing similar challenges.

Project Description

Introduction

Presumpscot River Watershed: The Presumpscot River, the largest freshwater source to Casco Bay, flows for 27 miles from Sebago Lake to the Casco Bay estuary, draining a 205 square mile watershed that includes 12 municipalities in Cumberland and York Counties. The watershed, which encompasses the greater Portland metropolitan area, is among the most developed and fastest-growing watersheds in Maine.

Historically, the ‘Pes-ompsk-ut’, or ‘river of many rough places,’ was primarily a riffle and pool system that supported abundant salmon, shad, and alewife stocks. Since the early 1700s, dams have blocked fish passage and severely altered the physical characteristics of the River. In 2000, American Rivers listed the Presumpscot the 13th most endangered U.S. river, primarily due to nine dams (now eight) that impound the river without fish passage.

The Presumpscot River is a river in recovery. In 1999, pulp mill discharges to the Presumpscot ceased and water quality has dramatically improved on the river, prompting a movement to upgrade the State water body classification. In 2002, the Smelt Hill Dam, the lowest of the nine dams on the river, was removed so that the lower seven miles of the Presumpscot and 100 miles of tributaries now flow freely to the estuary allowing unrestricted access for anadromous fish. Seven of the other dams are undergoing relicensing that will lead to opportunities to restore anadromous fish passage further upstream.

Despite recent improvements, water quality in the Presumpscot River remains degraded. As the river is cleaned up, development pressure along the relatively undeveloped shorelands continues to increase and the river is facing growing nonpoint source pollution loads. The lower Presumpscot River and nine tributaries are on Maine’s 303(d) list for non-attainment of class B water quality standards. Presumpscot River Watch (PRW) monitoring data indicate that several

other monitored tributaries do not meet class B standards for dissolved oxygen and bacteria during the summer months. Sedimentation via runoff and erosion has altered stream channels and degraded fisheries habitat. According to extensive assessment and monitoring work initiated by Presumpscot River Watershed Coalition (PRWC) partners, areas where roadways and livestock impact stream crossings are suffering from excess sedimentation that is deteriorating important fish spawning areas. Additionally, inputs from nutrients and toxics from residential areas and golf courses and the thermal impacts of lost riparian vegetation further impair water quality for the sensitive cold water fisheries targeted for restoration.

Water quality improvements are necessary to promote the return of native and anadromous fish species. This proposal targets turbidity/sediment load, dissolved oxygen, nutrients, bacteria, temperature, and toxics.

Presumpscot River Watershed Management Plan: In 2000, in response to the significant changes on the River, the Casco Bay Estuary Project (CBEP) convened a broad-based stakeholder group to develop a credible management plan for the Presumpscot River. The foundation of *A Plan for the Future of the Presumpscot River*, (the *Plan*) was a series of three detailed white papers containing a wealth of credible scientific analyses. The prioritized goals of the *Plan* (available on-line at <http://www.cascobay.usm.maine.edu/Presumpscot.html>) are to mitigate cumulative impacts, restore native anadromous fish, and protect and restore high value riparian habitats. Several tasks in this proposal address a high priority action from the *Plan*, to: “Identify and remediate nonpoint sources of pollution.”

Since the *Plan*’s completion in 2003, numerous assessments of the watershed have been completed by local, state, and federal watershed partners. These assessments include a detailed riparian corridor assessment of the entire lower watershed, three nonpoint source watershed surveys, two geomorphic analyses in Presumpscot tributaries, anadromous fish surveys, and a

field survey of all watershed stream crossings and agricultural operations. Recent water quality monitoring work includes the completion of a six-year monitoring report and a pilot study of daily and monthly temperature fluctuations in several tributaries.

Presumpscot River Watershed Coalition: PRWC grew out of the stakeholder process that developed the *Plan* and is firmly committed to its implementation. CBEP facilitates and provides support to this diverse group which represents a variety of interests in the watershed including municipalities, non-profit organizations, regional government entities, state and federal agencies, and businesses. The PRWC has facilitated several implementation projects in the watershed including extensive fish passage restoration at a tributary dam, promotion of the Natural Resource Conservation Service's Conservation Security Program for area farmers, and stewardship measures on local golf courses.

Description of the Proposed Projects

Overview and Effect on Watershed Health: The proposed scope of this two-year effort is designed to lower the overall sediment, bacteria, nutrient, and toxics loads to the watershed. The suite of proposed projects will address identified sources of water quality degradation and demonstrate better land stewardship to multiple stakeholder groups through partnerships with homeowners, students, and municipalities, as well as farms, golf courses, and other businesses. The monitoring components of the project will build on existing baseline data for the river and provide an indication of measurable progress. The project's educational outreach element will serve to transfer information and knowledge gained to all watershed stakeholders and will provide a model for other watersheds facing similar challenges. All of the proposed projects incorporate social and economic incentives as innovative approaches to promoting positive environmental land management.

Proposed Projects

1. Stream Crossing Erosion Control and Culvert Replacement at 62 sites (CCSWCD, YCSWCD, & Eight Municipalities)

The PRWC Cumulative Impacts Subcommittee aims to correct those problem areas where the construction of roadways, bridges and other stream crossings has altered the physical characteristics of the River and its tributaries. Excess soil erosion and sediment deposition has degraded vital stream habitat. Consultants conducted a technical assessment of the stream crossings within the Presumpscot River watershed in 2002. Based on results of this assessment, the Cumberland County Soil and Water Conservation District (CCSWCD) and York County Soil and Water Conservation District (YCSWCD) propose to stabilize each of the identified 56 eroding stream crossings and replace six improperly placed culverts to reduce pollutant loading throughout the watershed. CCSWCD and YCSWCD staff will provide municipal road crews with technical assistance and cost-sharing to address erosion and runoff problems for all identified roadside erosion sites. Eight municipalities will provide match through cash, material, and labor contributions under cost share agreements. Local students and volunteers will assist with field work through watershed service learning projects that will be showcased in local papers. This project also aims to obtain measurable results from stream crossing sites using USDA's WEPP: Road (Water Erosion Prediction Project for Roads) model. CCSWCD and YCSWCD staff will collect site data (before and after BMP implementation) and utilize the WEPP: Road model to quantify site-specific erosion and sediment reductions. CCSWCD and YCSWCD will compare WEPP: Road estimates to those of standard empirical models for soil loss currently being used by other watershed managers.

Project Cost: \$160,062 (Federal) + \$63,290 (Match) = \$ **223,352**

Start Date: October 2005; **End Date:** September 2007

Measurable Results: 62 Road/Stream crossings stabilized; approximately 81 tons of sediment per year eliminated from tributaries; improved turbidity and DO levels.

2. Planting of 3,000 Trees for Restoration and Enhancement of Riparian Areas (Casco Bay Estuary Project & Presumpscot River Watershed Coalition)

Task 2 will specifically address a high priority action from the *Presumpscot River Management Plan*, to: “Protect and enhance the riparian corridor by re-establishing forested buffers and siting development appropriately.” Utilizing an extensive riparian area habitat survey conducted by CBEP in 2004, CBEP, PRWC, and other partners will install forested buffers on five sites located throughout the watershed. An estimated 3,000 native upland and wetland variety trees will be planted to re-establish forested riparian buffers. The restoration sites will be utilized as demonstration sites located in high visibility areas including residential, agricultural, recreational, utility, and institutional land uses. A tour of installed buffers will be conducted targeting users, owners, and managers of similar land uses as part of the Presumpscot RiverFest in the summer of 2007.

Project Cost: \$89,629 (Federal) + \$60,000 (Match) = **\$149,629**

Start Date: October 2005; **End Date:** September 2007

Measurable Results: At least 3,000 upland trees planted, five critical riparian areas restored.

3. Agricultural Management Improvements for Eight Presumpscot Watershed Farms (CCSWCD & Agricultural Operators)

In Task 3, CCSWCD will address bacterial contamination and stream bank erosion problems associated with livestock use of tributaries as a water source, which contributes high amounts of water-borne bacteria, sediments, and nutrients to the watershed. Based on a recent agricultural needs assessment, CCSWCD proposes to establish a 50% matching cost-share program with landowners to address eight sites in need of streamside fencing and alternative watering systems. Targeted Watershed project funds will leverage the significant financial assistance provided through Farm Bill conservation programs, including the USDA Natural Resources Conservation Service’s *Casco Bay Watershed Conservation Security Program*, by complementing the efforts provided to other watershed farmers for conservation practices.

Project Cost: \$81,181 (Federal) + \$37,500 (Match) = **\$118,681**

Start Date: October, 2005; **End Date:** September, 2007

Measurable Results: At least 4,000 feet of streamside fencing and eight watering systems for eight agricultural sites; reduced downstream bacteria levels.

4. Golf Course Environmental Certification and Equipment Wash Pads (PRW & CBEP)

PRW will build upon a successful pilot program to target six golf courses located directly on the shoreline of the Presumpscot River or its main tributaries. The pilot program resulted in the commitment of two watershed golf courses to modify management practices to reduce environmental impacts related to course maintenance. Working with the internationally recognized six-point Audubon International guidelines for golf courses, PRW staff will actively work with course owners, superintendents, and members on the measurable environmental improvements necessary to become certified as an Audubon International Cooperative Sanctuary. The initial outreach to golf courses will focus on market-based approaches including providing documentation of substantial course maintenance cost-savings for other regional courses that have become certified sanctuaries through the Audubon International program. In addition, the project will provide matching funds for three equipment wash pads (including two on municipal courses, at least one of which will be used for demonstration purposes) which have been identified as critical needs to contain concentrated pollutant runoff and reduce in-stream levels of pesticides and herbicides.

Project Cost: \$39,144 (Federal) + \$21,880 (Match) = **\$61,024**

Start Date: October 2005; **End Date:** September 2007

Measurable Results: Audubon International certification for six watershed golf courses; three installed equipment wash pads, lower levels of pesticides and herbicides downstream from equipment washing areas.

5. “Yardscaping” to Reduce Nonpoint Source Pollution (CCSWCD, Friends of Casco Bay, and Maine Board of Pesticide Control)

CCSWCD will collaborate with the Friends of Casco Bay (FOCB) to reduce pollution caused by pesticide and fertilizer use in twelve Presumpscot River watershed neighborhoods. The innovative *YardScaping* program incorporates education, research, demonstration, and incentives to educate the public about the potential transport of pesticides and fertilizers to the receiving waters of the Presumpscot River. The aim is to reduce pollution stemming from the application of lawn and garden chemicals by homeowners, developers, businesses, and municipalities by providing clear and effective recommendations for lawn and garden care that delivers aesthetic and recreational benefits while safeguarding water quality.

The approach will be modeled on the successful Washington Sea Grant Septic Social Program that helped to familiarize homeowners with their septic systems and resulted in 100% of the social participants changing their septic system practices based on the information exchanged during the social. CCSWCD will make personal contacts with key people in the targeted neighborhoods in order to ensure sizeable participation in these workshops. Staff will then work with the host to tailor the workshop to the specific needs of their neighborhood.

During the social, participants will be provided with criteria about what constitutes “river-friendly” lawn and garden practices, and offer specific strategies to reduce reliance on lawn and garden chemicals. In addition, workshop participants will be offered free soil testing and technical assistance to translate soil test results into on-the-ground practices. A phone survey will be carried out within six months of the *YardScaping* social to assess lawn care and garden practices. Property owners will also be provided with recognition incentives for reducing their use of pesticides and fertilizers, including the ultimate *YardScaping* “certification” administered in conjunction with the Maine Board of Pesticide Control.

Project Cost: \$34,132 (Federal) + \$16,951 (Match) = **\$51,083**

Start Date: October, 2005; **End Date:** September 2007

Measurable Results: Percentage of *YardScaping* participants who change landscaping practices; before and after behavioral survey results; number of *YardScaping* participants who receive *YardScaping* incentive rewards.

6. Education and Outreach (CBEP, PRWC, CCSWCD, University of Southern Maine)

The overarching education and outreach task will involve development of an interactive website that targets schools, citizens, and businesses within the watershed. The website will include an extensive internet Geographic Information System (GIS) mapping component that enables the use of colorful and informative maps. As a centralized clearinghouse for all data and knowledge gained from the project, the website will serve not only to educate and coordinate stakeholders but will also provide an accessible information source for other watershed managers to utilize these project models. The website will be marketed to target audiences using a combination of techniques such as press releases, flyers in municipal facilities, and take-home announcements for students.

Project partners will oversee the creation of a comprehensive, spatially enabled, digital database of all materials gathered throughout the project including monitoring results and Best Management Practices installed. All materials will be keyed to a point or region in space, enabling users to search for data using a GIS map layer. Whenever possible, the database will also incorporate historical datasets and any other available data. A user-friendly GIS project CD containing free software and hot-linked maps with detailed information on the watershed will be formally presented to watershed schools as part of the Presumpscot River Targeted Watershed “Maps for Schools” program. Finally, a Presumpscot RiverFest will be organized in 2007 to celebrate the successful projects and improved health of the river.

Project Cost: \$86,300 (Federal) + \$28,000 (Match) = **\$114,300**

Start Date: September 2005; **End Date:** October, 2007

Measurable Result: Ten hands-on presentations to towns and schools; outreach provided by Presumpscot RiverFest.

7. Water Quality Monitoring (PRW, FOCB, Maine Department of Environmental Protection, and CBEP)

Monitoring: State fisheries agencies and other organizations are collecting data on returning anadromous fish as an indicator of recovery of the Presumpscot River ecosystem. To complement this effort, PRW and FOCB will oversee the water quality monitoring and evaluation components of this project. PRW and FOCB will supplement existing monitoring programs (14 years of historical data) to monitor for multiple parameters with the use of data sondes to include multiple parameters. Data sondes will be anchored on the lower Presumpscot River and three lower tributaries for six months of each year within the two-year project period to collect continuous water quality information and provide initial data for a planned long-term monitoring program. Monitoring will also expand to include analyses above and below sites mitigated under Task 1 (Road Crossing and Culvert Replacement – DO and turbidity analysis); Task 3 (Agricultural Management Improvements – bacteria analysis) and Task 4 (Golf Course Management and Equipment Wash Pads – toxics analysis). A project design team of academic, state, and local experts will assist in developing a project monitoring plan that focuses on obtaining measurable results. An EPA and Maine DEP approved Quality Assurance Project Plan will be utilized and all data will be entered into STORET.

Project Cost: \$192,343 (Federal) + \$61,015 (Match) = **\$253,358**

Start Date: October 2005; **End Date:** September, 2007

Measurable Result: QAPP; continuous monitoring data six months per year for four sites.

Monitoring and Evaluation: The proposed work includes a mid-project evaluation conducted by local project partners, the Maine DEP, and EPA, in addition to the detailed water quality and applied field monitoring components in Task 7. Pollutant load estimates will be calculated as indicated in Task 1, and behavioral survey results will be provided for Task 5.

Environmental Outcomes: Environmental outcomes are identified within each project task and summarized below each task with project cost information. Anticipated outcomes

include the WEPP: Road sediment reduction measurements obtained from stabilization of 56 stream crossing sites and six culvert replacements, reduced waterborne bacteria levels downstream of livestock exclusion agricultural improvement sites, and 3,000 trees planted to re-establish forested riparian buffers at five locations throughout the watershed. This proposal targets turbidity/sediment loads, dissolved oxygen, nutrients, bacteria, temperature, and toxics.

Consistency with Other Programs: The proposed project will be administered by the Casco Bay Estuary Project, one of the 28 U.S. EPA National Estuary Programs nationwide. The proposed work advances many of the goals of the broader *Casco Bay Plan*, including those related to stewardship, water quality, and habitat. It also supports the Maine Department of Environmental Protection efforts to assure that its rivers and streams are attaining waterbody use classifications and efforts are being undertaken to restore impaired water bodies. The proposed project also supports multiple state (ME Department of Marine Resources, ME Dept. of Inland Fisheries & Wildlife, and ME Atlantic Salmon Commission) and federal (U.S. Fish and Wildlife Service) agency goals to restore anadromous fish to the Presumpscot River.

Outreach Activities: The proposed project incorporates engaging and innovative education and outreach activities within the individual projects in addition to the work described in Task 6. Examples of educational components within the individual project tasks include the *Yardscaping* project, which involves the public directly in the reduction of household pesticide and fertilizer use, visits to golf course wash pad demonstration sites, and tours of the riparian buffer restoration demonstration sites. Volunteers will also participate in buffer restoration activities, and the general public will participate in Presumpscot Riverfest activities, including site tours. Project staff will present project success stories at three state or regional conferences and workshops to promote the transfer of valuable information to other citizens, agencies, and watershed groups.

Table 1. Budget

SECTION A. BUDGET SUMMARY

Watershed Project, Activity, or Work plan Element	Federal	Non- Federal	Total
1. Stream Crossing Erosion Control and Culvert Replacement	\$160,062	\$ 63,290	\$ 223,352
2. Riparian Buffer Enhancement	\$ 89,629	\$ 60,000	\$ 149,629
3. Agricultural Management Improvements	\$ 81,181	\$ 37,500	\$ 118,681
4. Golf Course Environmental Certification	\$ 39,144	\$ 21,880	\$ 61,024
5. Landscaping	\$ 34,132	\$ 16,951	\$ 51,083
6. Education & Outreach	\$ 86,300	\$ 28,000	\$ 114,300
7. Monitoring & Evaluation	\$192,343	\$ 61,015	\$ 253,358
8. Project Management & Administration	\$117,150	\$ -	\$ 117,150
Totals	\$799,942	\$ 288,636	\$1,088,578

SECTION B. BUDGET CATEGORIES

Watershed Project, Activity, or Workplan Element									
Budget Categories	1	2	3	4	5	6	7	8	Total
a. Personnel	\$ 6,388	\$ 7,097	\$ 4,613	\$ 3,549	\$ 3,549	\$ 7,097	\$ 8,872	\$ 42,583	\$ 83,747
b. Fringe Ben.	\$ 2,612	\$ 2,903	\$ 1,887	\$ 1,451	\$ 1,451	\$ 2,903	\$ 3,628	\$ 17,417	\$ 34,253
c. Travel	\$ 2,524	\$ 250	\$ 1,451	\$ 1,000	\$ 2,303	\$ 600	\$ 1,371	\$ 5,750	\$ 15,249
d. Equipment	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 77,608	\$ -	\$ 77,608
e. Supplies	\$ -	\$ 75	\$ -	\$ 500	\$ 3,202	\$ 10,600	\$ 1,844	\$ 1,500	\$ 17,721
f. Contractual*	\$ 80,250	\$ 15,000	\$ 31,240	\$ 14,000	\$ 20,832	\$ 47,000	\$ 81,296	\$ 21,500	\$ 311,118
g. Construction	\$ 58,370	\$ 45,000	\$ 37,500	\$ 15,000	\$ -	\$ -	\$ -	\$ -	\$ 155,870
h. Other	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
i. Total Direct Charges	\$150,144	\$ 70,325	\$ 76,691	\$ 35,500	\$ 31,337	\$ 68,200	\$ 174,619	\$ 88,750	\$ 695,566
j. Indirect Charges	\$ 9,918	\$ 19,304	\$ 4,490	\$ 3,644	\$ 2,795	\$ 18,100	\$ 17,724	\$ 28,400	\$ 104,376
TOTAL	\$160,062	\$ 89,629	\$ 81,181	\$ 39,144	\$ 34,132	\$ 86,300	\$ 192,343	\$ 117,150	\$ 799,942

* Includes subcontracts with all project partners (PRW, FOCB, CCSWCD, etc.)

Project Management

CBEP and PRWC will be directly involved in providing oversight to this project. A Project Coordinator will work directly with PRWC partners to manage individual project tasks and provide leadership for the initiative. Through their diverse partners, both CBEP and the PRWC have the credibility and expertise to successfully implement the proposed projects.

CBEP has significant experience administering and implementing projects on this scale, as well as with U.S. EPA reporting requirements. CBEP has been implementing the *Casco Bay Plan* since 1995, and has successfully accomplished significant measurable environmental results (e.g. re-opening more than 300 acres of shellfish beds to harvest). Karen Young, Director of CBEP since 2002, has over twelve years experience in applied coastal and aquatic environmental science project management. Previously, she worked for the Massachusetts Bays National Estuary Program for nearly four years and consulted as an aquatic toxicologist for five years on coastal water quality, wastewater permitting, and ecological risk assessment. She holds a Master of Environmental Management degree from Duke University.

PRWC is a coalition of over twenty-five organizations, municipalities, agencies, and stakeholders who have been working together over the last four years on both the development of the *Plan* and various water quality assessment and improvement projects on the Presumpscot River. Forrest Bell, PRWC Executive Board Vice-Chair and Executive Director of PRW, has managed more than thirty-five watershed assessment and restoration projects over the past fourteen years. Forrest has managed the Maine Lake TMDL program since 1999 for the Maine Association of Conservation Districts and Maine DEP. He has completed coursework towards a MS in Natural Resource Management from the University of New Hampshire.